

Claims

- [c1] 1. An electronic flash apparatus for a camera comprising:
a housing having an open end;
a white light LED mounted in said housing; and
a cover lens positioned over said open end of said housing for transmitting light emitted from said LED.
- [c2] 2. The electronic flash apparatus of claim 1, further comprising a DC power supply.
- [c3] 3. The electronic flash apparatus of claim 2, wherein said DC power supply includes a battery cell of a type selected from the group consisting of alkaline, nickel cadmium, standard, heavy duty, lithium, and nickel metal hydride batteries.
- [c4] 4. The electronic flash apparatus of claim 1, further comprising a power and control circuit.
- [c5] 5. The electronic flash apparatus of claim 4, wherein said power and control circuit includes a switch that allows power from a DC power supply to be selectively provided to said LED.
- [c6] 6. The electronic flash of claim 4, wherein said power and control circuit allows said LED to be synchronized with an associated camera such that said LED is activated when a picture is taken with said camera.
- [c7] 7. The electronic flash apparatus of claim 1, wherein said cover lens is a fresnel lens.
- [c8] 8. The electronic flash apparatus of claim 1, wherein said cover lens is a refractive lens.
- [c9] 9. The electronic flash apparatus of claim 1, wherein said LED is a white light UV-phosphor LED.
- [c10] 10. The electronic flash apparatus of claim 8, wherein said LED is a high brightness or ultra high brightness LED.

- [c11] 11. The electronic flash apparatus of claim 1, wherein said cover lens is mounted such that it is flush mounted with a front surface of a body of an associated camera.
- [c12] 12. The electronic flash apparatus of claim 1, wherein said LED includes a transparent protective portion and an LED chip embedded in said protective portion.
- [c13] 13. The electronic flash apparatus of claim 1 comprising a plurality of LEDs.
- [c14] 14. The electronic flash apparatus of claim 1, wherein said LED has a light emission angle such that the LED does not emit light directed at said housing.
- [c15] 15. The electronic flash apparatus of claim 1, comprising a single LED.
- [c16] 16. The electronic flash apparatus of claim 1, wherein said flash apparatus is free of a reflector.
- [c17] 17. The electronic flash apparatus of claim 1, further comprising a reflector mounted in said housing for directing light emitted by said LED toward said open end of said housing.
- [c18] 18. An electronic flash apparatus for a camera comprising:
a housing having an open end;
a white light LED mounted in said housing; and
a reflector mounted in said housing.
- [c19] 19. The electronic flash apparatus of claim 18, wherein said reflector comprises a reflective interior surface of said housing.
- [c20] 20. A camera comprising:
a camera body;
a housing having an open end;
an LED mounted in said housing such that light emitted from said LED is directed through said open end of said housing toward an object to be photographed;
a cover lens mounted on said open end of said housing for transmitting light

emitted from said LED;
a DC power supply;
a control circuit; and,
a means for connecting said DC power supply and said control circuit to said LED.

[c21] 21. A method for producing an LED electronic flash apparatus for a camera comprising the steps of:
providing a white light LED;
providing a housing having an open end;
providing a cover lens;
providing a DC power source;
mounting said LED in said housing;
mounting said cover lens over said open end of said housing;
operatively connecting said DC power source to said LED; and,
mounting said housing, said LED and said DC power source in a camera.

[c22] 22. The method according to claim 18, wherein the step of providing a white light LED is performed by providing a UV-phosphor white light LED.